



**CONICYT**  
Ministerio de Educación

Gobierno de Chile

# international relations CONICYT



- Major milestone in scientific cooperation with China
- CONICYT signs important agreements in South Korea & Japan
- Chilean collaboration in CERN experiments
- ERANet-LAC project scope explained
- CONICYT-AKA research on education outcomes

issue 20 /October 2013





**at-a-glance**

**news clips**

**european connection**

**interview**

**projects**

**agenda**

**W**elcome to issue 20 of CONICYT's International Relations quarterly newsletter, which maintains a communication channel for all stakeholders interested in international cooperation in science and technology with Chile.

In this issue we are pleased to inform you about the creation of the CAS-CONICYT Fund for the development of joint astronomical research, a major milestone in the Chinese-Chilean scientific cooperation. We also report on the positive results of CONICYT's mission to South Korea and Japan, including the signing of important agreements that will allow to strengthening scientific and academic cooperation with the two countries. This recent institutional mission reinforces the links established by CONICYT with key partners in Asia.

In this issue we also look at Chilean participation in European Organization for Nuclear Research's experiments five years from the signing of the Protocol to the Cooperation Agreement between CONICYT and CERN.

In the Voices sub-section of European Connection, Marianne Vaske and Stephanie Splett-Rudolph, from the German Federal Ministry of Education and Research (DLR), offer an insight into how ERANET-LAC, a Network of the European Union (EU), and the Community of Latin American and Caribbean States

(CELAC) on Joint Innovation and Research Activities, will support international cooperation in science, technology and innovation.

In Interviews, we look at how a joint research project on non-conventional renewable energy (NCRE) with China is taking advantage of international cooperation programmes to broaden the project's impact.

And in Projects we provide at a glance review of some of the main results of the CONICYT-AKA research projects on education as they come to an end.

We hope you find this issue enjoyable and informative. Please do email us with your feedback or ideas for content.

Department of International Relations  
CONICYT

The Department of International Relations welcomes all comments and suggestions from readers. Please email us at [relacionesinternacionales@conicyt.cl](mailto:relacionesinternacionales@conicyt.cl)

Cover photo: Japan's National Museum of Emerging Science and Innovation .



## CAS-CONICYT Fund for joint astronomical research

As a result of the efforts undertaken in the last 3 years by CONICYT the Chinese Academy of Sciences (CAS) will contribute annually with nearly 3 million USD to the CAS-CONICYT Fund for the development of astronomical research in Chile.



Mateo Budinich, Acting President of CONICYT (left) and Prof. Bai Chunli, President of CAS.

This important milestone in scientific and technological cooperation between China and Chile was announced by Mateo Budinich, Acting President of CONICYT and Prof. Bai Chunli, President of CAS, in a ceremony held on the 4th of October in Santiago.

The Fund will be used for supporting bilateral collaboration activities in astronomical research, including a call in 2014 for post-doctoral fellowships in astronomy and astrophysics aimed at young researchers in Chile, as well as future opportunities for joint research projects. This initiative will also allow the establishment of the China-Chile Joint Centre for Astronomy (CCJCA) in Santiago, the first scientific institution set up by CAS outside China.

The Fund is the result of a series of initiatives undertaken in the last 3 years by CONICYT to enhance scientific cooperation between the two countries. The CAS-CONICYT Fund was created within the framework of the MoU on scientific collaboration for the development of astronomical research signed by CONICYT and CAS last September. Previous initiatives included the Action Plan 2011-2013 signed by CONICYT and the Ministry of Science and Technology of the People's Republic of China (MOST) in December 2010, included the donation of scientific equipment to replace of those damaged by the earthquake to five Chilean universities. Another initiative was

the signing of a Memorandum of Understanding (MoU) between CONICYT and CAS in August 2012 in Beijing. Both initiatives sought to promote joint activities in the area of astronomy to enhance interaction among research, higher education and industrial organizations, promoting basic and applied research, innovation and capacity building.

Within the framework of these initiatives, CONICYT organized four scientific workshops, with the Chile-China Workshop on Astronomy and Astrophysics held in Santiago in 2011 being the first of those in the area. The same year China was included as a counterpart in the annual CONICYT Call for Proposals in Support for International Networking between Research Centres, which funds one year networking projects in any area of expertise between research centres in Chile and those based abroad. Later on in 2012, a second workshop in astronomy and astrophysics took place in Beijing, which was attended by 15 researchers from Chile and a group of Chinese astronomers interested in collaborating with Chile.

Other relevant scientific cooperation activities with Chile in the last few years were two workshops, one in the area of renewable energies and another on food security in Beijing in 2011. Furthermore, September 2013 saw, in Viña del Mar (Chile), a workshop organized by the Chilean Astronomy Society (SOCHIAS) with the support of CONICYT.

## Words from the President of CAS

The China-Chile Joint Centre for Astronomy is the first overseas research establishment of CAS and the new joint fund between our two institutions will support young scientists mainly from our two countries to carry out cooperative research in the field of astronomy and astrophysics.

These milestones mark a big step forward in the bilateral collaboration in Astronomy, and show our strong commitment to strengthen the existing collaboration and bring it to a new higher level. With the centre established, I believe that the collaboration among the astronomical communities from China, Chile and others will further advance.

It goes without saying that the successful running of the centre is key to achieve our shared goals. For that, we need the continuous support of our cooperative partners here in Chile. We hope that we will together achieve some good results in the cutting-edge research of this field.

It is understood that there are growing demands for China-Chile scientific cooperation in the areas of our mutual interest. Astronomy is now what we start with, but our collaboration could go further into some other fields. I am pretty sure that our collaboration in astronomy will bring positive impacts to the overall bilateral S&T collaboration and even set a good example in our bilateral ties.

We live in the era of globalization in which science, technology and innovation changes our lives at an unprecedented rate. International cooperation, as an important catalyst to enhance global capacity building and innovation, is essential to this exciting process. Let us work together to further our collaborative partnership for the advancement of science and the well-being of our peoples.

Excerpt from the full address by Prof. Bai Chunli at the Launching Ceremony of the CAS-CONICYT Fund for astronomical research in Santiago on the 4th of October.



Prof. Bai Chunli at the Launching Ceremony of the CAS-CONICYT Fund for astronomical research.

## CONICYT's mission to South Korea and Japan

A delegation led by CONICYT's President Dr. José Miguel Aguilera went to South Korea and Japan to establish links with key contacts in science and technology in both countries in order to implement joint actions and learn about their respective national S&T systems.



Japan's National Museum of Emerging Science and Innovation

## CONICYT-NRF Agreement

In Daejeon, South Korea, the President of CONICYT and the President of the National Research Foundation of Korea (NRF), Dr. Seung Jong Lee, signed on the 27th of August a Memorandum of Understanding (MoU) to enhance cooperation in science and technology between the two countries. The cooperation agreement includes joint calls for research projects, conferences and workshops, exchange of information and researchers.

## Chile-Korea Workshop

Among the first steps towards enhancing cooperation in science and technology between Chile and South Korea following the signing of the agreement, a scientific workshop organized by CONICYT and NRF, in partnership with the Embassy of Korea in Chile, will take place on the 26th and 27th of November in Santiago. The activity will focus on the areas of biotechnology, renewable energies, astronomy and polar Antarctic science. The event will be a unique opportunity for researchers in Chile to meet researchers from South Korea and discuss future cooperation opportunities. Another initiative to be implemented following the agreement will be a CONICYT-NRF joint call for proposals for international networking between research centres to promote exchange between researchers in Chile and those in South Korea in all research fields. The call will be launched in March 2014.



Dr. Seung Jong Lee, President of NRF and Dr. José Miguel Aguilera, President of CONICYT

## CONICYT partners with JSPS in Tokyo

A CONICYT's delegation met in Tokyo with the President of the Japan Society for the Promotion of Science (JSPS), Dr. Yuichiro Azai. During the meeting both institutions agreed to link their respective calls for proposals for networking projects between researchers in Chile and those based in Japan. Applications in Japan will open in December 2013, while researchers in Chile may submit their proposals in March 2014. The call will be opened to all areas of expertise. CONICYT's agenda in Japan also included the signature of a cooperation agreement with the University of Tokyo (UTokyo), one of the most prestigious universities in the country. The agreement, signed on the 3rd of September by the President of UTokyo, Dr. Junichi Hamada and the President of CONICYT, aims to promote the training of Chilean PhD students, and postdocs in all fields, and support study visits for senior undergraduate engineering students to UTokyo.



Dr. Yuichiro Anzai, President of JSPS and Dr. José Miguel Aguilera, President of CONICYT.

## Utokyo Forum 2013 in Santiago

CONICYT's scientific mission to Japan will be followed by the UTokyo Forum 2013 ("Global emergence of frontier knowledge") to take place in Santiago between the 7th and 8th of November in partnership with the Pontificia Universidad Católica (PUC) and Universidad de Chile. The forum is a biennial event which provides a chance for UTokyo to present new research developments and results to the world in close partnership with globally renowned academic institutions around the world, as well as to broaden international exchanges between researchers and students. The event will be attended by over 60 researchers from UTokyo and will be focused on the following areas: Asian studies, astronomy, biological sciences, chemistry, frontier sciences, information engineering, material science, renewable energy, seismology, among others.



Dr. Junichi Hamada, President of UTokyo and Dr. José Miguel Aguilera, President of CONICYT.

Dr. José Miguel Aguilera met Dr. Teru Fukui, Senior Viceminister of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan. The meeting included talks about priority areas for both countries, namely space, oceanography, and natural disasters.



## UPDATES



### Results of the 2013 Abate Molina Prize for Excellence in Science

CONICYT in partnership with the Alexander von Humboldt Foundation are pleased to announce that Dr. Jost Heintzenberg will be the recipient of the 2013 Abate Juan Ignacio Molina Prize for Excellence in Science. The award recognizes German researchers or experts outstanding contribution to science in any area of expertise. The award carries with it an unrestricted grant of €30,000. Dr Heintzenberg has been widely recognized for his contribution in the area of atmospheric chemistry and physics, particularly on the effects of aerosols on the environment. As a result of his outstanding research contributions, Dr. Heintzenberg received an award for a scientific radio programme of the National Swedish Broadcasting Company, and was chosen the "Aerosol Researcher of the Year" in 1988 by the Scandinavian Society for Aerosol Research. Dr. Heintzenberg also has participated

in important international committees such as the International Geosphere-Biosphere Programme (IGBP). He is emeritus member of the Leibniz Institute for Tropospheric Research (IFT) and vice-president of the Internacional Global Aerosol programme. Dr. Heintzenberg will carry out a research visit at the Centre for Environmental Technologies (CETAM) of the Universidad Técnica Federico Santa María, institution which nominated him for the award, taking part in the Antarctic sampling campaign of a CETAM project, as well as in activities open to the Chilean scientific community. The award ceremony will be held in October in Santiago.

### Chilean map of excellence in key research areas

The Chile-European Union STI Initiative project (CEST+I) has drawn-up a map identifying the scientific research centres of excellence throughout the country in 6 research areas: biotechnology, energy, seismology, mining, astronomy and Antarctic science. The map identifies scientific research institutes, innovative business and entrepreneurial projects throughout Chile and provides valuable contact information. The catalogue is available on the [CEST+I website](#).



## UPDATES



### ICT & e-Infrastructures Conference

The ICT & e-Infrastructures Conference for R&D cooperation between the EU and LAC, co-organized by the AMERICAS project and CUDI, the Mexican National Research and Education Network, with the support of the European Commission, took place on the 3rd and 4th of October in Campeche, Mexico. The objectives of the Conference were to raise awareness of the power and opportunities of e-infrastructures for EU-LAC cooperation in ICT R&D, and to show the impact of e-Infrastructures used in different e-Science domains: Life Sciences, Earth Science, Engineering, Data Access & Preservation, Astronomy & Astrophysics, Computer Science and Mathematics. The Conference provided an international forum to network between ICT and e-Infrastructures communities, to exchange views, share information and identify new opportunities for R&D collaboration between Europe and Latin America. Alejandro Lara, a civil engineer of the Red Universitaria Reuna, the main actor in e-infrastructure in Chile, attended the event supported by CONICYT.

### Bi-regional projects discuss future co-operation in the ICT area

The Workshop on Joint Strategies for future cooperation initiatives, organized by the [AMERICAS](#) project with the support of the Ministry of Science, Technology and Productive Innovation of Argentina (MINCYT), and the European Commission, took place on the 11th of September in Buenos Aires, Argentina. The activity aimed at sharing experiences and discussing future cooperation initiatives in ICT research and innovation, such as coordinated calls between Europe and Latin America; exploring ICT research priorities for the implementation of joint strategies; and identifying potential financing instruments and cooperation schemes for EU-LAC cooperation in ICT. The Workshop was attended by decision makers and funding agencies from Latin America, representatives from the European Commission and ICT stakeholders. Following the Workshop the ALCUENET project held on the 12th of September and also in Buenos Aires, a working meeting to look for synergies among international cooperation projects in the ICT area. Those who attended the meeting discussed more efficient ways to coordinate different Latin American initiatives in ICT, and the implementation of the EU-LAC Gateway stand in the EU ICT 2013 Conference "Create, Connect, Grow" to be held in Vilnius, Lithuania from the 6th to the 8th of November. During the working meeting CONICYT gave a presentation about the main characteristics of the CEST+I project identifying possible synergies with other regional bilateral projects funded by the EU.



## CASE STUDY

## Chile's participation in CERN's massive collaboration

The European Organization for Nuclear Research (CERN) based in Switzerland, is the world's largest particle physics laboratory. An estimate 7,500 scientists, engineers, students and technicians from 60 countries collaborate with CERN's experiments in their search for new phenomena and the particles that make up dark matter. This massive international scientific and technological collaboration includes three Chilean universities. These institutions have come a long way in the last five years developing critical mass and consolidating their respective research groups—mainly in the areas of experimental physics and computing engineering. Most of these endeavours have been supported by CONICYT.

A major milestone for Chilean participation in CERN took place in 2007, when CONICYT and CERN signed a Protocol to the co-operation agreement of 2004. This Protocol provided a framework for the long-term participation of students and scientific and technical staff from Chile's universities and research institutes in CERN's experimental programme, allowing two Chilean universities, the Pontificia Universidad Católica (PUC) and Universidad Federico Santa María (USM) to become members of ATLAS, one of the two largest particle detector experiments within the Large Hadron Collider (LHC), the world's largest and most powerful particle accelerator.

The signing of the 2007 Protocol between CONICYT and CERN allowed for the development of experimental physics in Chile as never before. "Previous to the Protocol, Chile had a well

established community of researchers in theoretical particles physics, fields theory and gravitation, but only theoretical, an experimental area had not been developed. This Protocol offered the possibility for Chilean researchers to become part of the ATLAS experiment at CERN. I think this would not have been possible without the funding committed by the Protocol", said Dr. Marco Aurelio Diaz, leader of the experimental group at PUC. Dr. Ivan Schmidt, leader of the theoretical physics group at USM, adds: "the Protocol also enabled many students and engineers to get involved in CERN's experiments, which is very important for the applications we envisage the experiments may have".

### Chile and the Higgs boson

Shortly after its inauguration the LHC had to be shut down for an electrical fault. Later on, in 2009 scientists around the world celebrated the first



Monument given to CERN by the Swiss government. Photo credit: CERN

## CASE STUDY

collisions after more than a year of repairs. The first of the four LCH experiments to see the collisions was the ATLAS detector, where Dr. William Brooks, head of the experimental particle and high-energy nuclear physics research group at USM, led the efforts related to heavy ion collisions, which are important because they may be the way to fabricate Plasma, the fourth state of matter. "Given the massive importance of this collaboration we take great pride in having had one of our colleagues as one of the leaders of ATLAS", says Dr. Schmidt.

The main focus of the team led by Dr. Díaz at PUC has been on analysis and trigger. "Millions of collisions per second

## IN 2007 CONICYT AND CERN SIGNED A CO-OPERATION AGREEMENT THAT PROVIDED A FRAMEWORK FOR THE LONG-TERM PARTICIPATION OF STUDENTS, SCIENTISTS AND TECHNICIANS FROM CHILE IN CERN'S EXPERIMENTS.

take place and even the combined capacity of all the computers in the world would be insufficient to store all that information, so there has to be a selection", explains Dr. Díaz, "the trigger has a hardware component and a software component that decide at the moment of collision whether it is worth recording it." With the first LHC collisions scientists all over the world became excited and hopeful about the discoveries that could follow, particularly in relation to the Higgs boson.

The existence of the elusive particle had been predicted 45 years ago by Professor Peter Higgs and it promised to explain how matter attains its mass. Eventually, the long awaited event took place in July 2012 when the ATLAS and CMS experiments reported having observed a particle consistent



with the Higgs boson. The event, another milestone for Chilean participation at CERN, attracted well-deserved attention says Dr. Díaz, who also collaborated in the discovery. "Up to that moment the Higgs boson could not have been discovered due to the lack of a machine that could generate enough energy to produce it. This is a short-lived particle that only destroys itself, hence the only way to see the particle is by fabricating it and waiting in a millionth of a second for it to destroy itself", says Dr. Díaz.

Currently the LHC is not operating and research groups are working on improving their own detectors. PUC and USM research groups have teamed up to work on upgrading ATLAS' muon detector. The idea, explains Dr. Díaz, is to make improvements to increase the energy of the collisions. Additionally, says Dr. Schmidt, both universities will collaborate in the construction of the so-called muon new small wheel, a project considered to be of the upmost priority in the ATLAS upgrade programme. "This project involves the participation of an important number of physicists, engineers and students who are going to receive training at the highest level to subsequently use this technology for a number of applications". One of these applications, explains Dr.

Dr. José Miguel Aguilera, President of CONICYT at CERN in 2011. Photo Credit: CERN.

## CASE STUDY

Díaz, may be in the field of medical physics where the latest developments point at treating diseases such as cancer using elemental particles, which are first accelerated and then made to collide inside the human body.

**The snowball effect**

Another important aspect of Chilean collaboration with CERN is the World Wide LHC Computing Grid Collaboration (WLCG), a system similar to the World Wide Web that allows for the processing of the huge amount of information generated by CERN's experiments. In particular, USM has been part of this collaboration for a few years, accessing the project facilities through local computing resources, and it is now aspiring to become an important computing centre linking up national and international grid infrastructures. "The impact of this collaboration on informatics and electronics is huge. We have several laboratories in electronics that have resulted from our work in this centre and the collaboration with CERN", says Dr. Schmidt.

Chile has also been involved in the ALICE experiment since December 2011, when the Universidad de Talca (UTalca) became a member. This university is the first Chilean university, while Chile is the third Latin American country (after Brazil and Peru), to join ALICE. However, UTalca's participation in ALICE, which consists of being one of the high performance computing laboratories where physicists at CERN send their data to be processed, is also interesting because its focus is not on physics. In fact UTalca, says

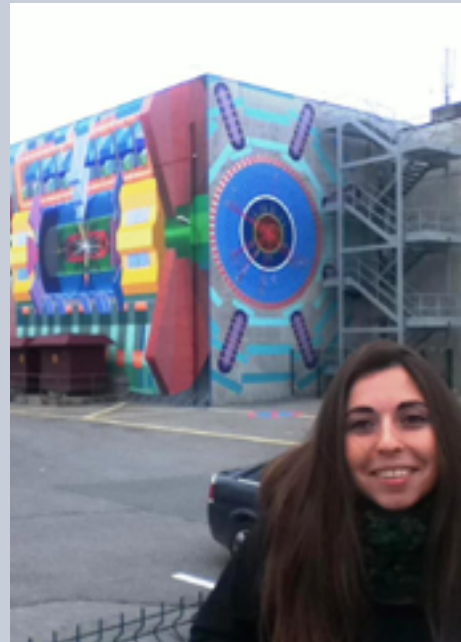
**A student's point of view: "An eye opening experience"**

*The Chilean collaboration with CERN has benefited Chilean students from the area of experimental particle physics and engineering, who have been to Geneva to be part of research teams working at CERN. We asked Giovanna Cottin (25), PhD in Physics student at Cambridge University, who has been a member of the ATLAS collaboration since 2011, how her experience at CERN has impacted on her career.*

I studied physics at PUC and from near the end of my first degree I became interested in being part of the high energy physics community. Following my graduation I started a Masters degree in the tau trigger group of ATLAS, where we studied data from collisions, making sure the detection of the different particles is made efficiently.

In January 2013 I made a one month research visit to CERN to continue the work I had done remotely during my MSc. One of the things that struck me the most was that at CERN work is more collaborative than I was used to and this helps you to learn more quickly. That experience was vital for my training as a physicist because I met researchers from the universities where I was applying to do my PhD, so it helped me to become familiar with the environment. From Chile it is difficult to realize the scale of the collaboration and to understand how to move in this world. It was an eye-opening experience and it helped me to make myself known.

In March I participated with students from all over the world, in the 2013 CERN Latin American School of High Energy Physics that took place in Arequipa, Peru, where I presented a poster. This was an opportunity to meet professors I had heard of and to learn about what is being done in the area.



Now I am preparing to begin a PhD on ATLAS at Cambridge University. Being part of an international collaboration project makes me feel that everything I do contributes to something much bigger. At the end of the day, the aim is to lay solid foundations for the physics we know today and that makes me feel very motivated.

My plan is to complete a successful PhD and establish a good network of contacts, disseminate what we do in Chile and then return to the country and play an important part in connecting Chile with the rest of the world in the area of experimental physics.

Sergio Guiñez, leader of the collaboration of this university with CERN, is interested in using distributed computing for the storage of biomedical images. So far, one of the most relevant results of the collaboration in ALICE has been a workshop for developers organized in November 2012 in Talca by the university and CERN. The workshop was attended by senior ALICE members, academics in the field of bioinformatic engineering, students and professionals. According to Guiñez, being part of one of the world's most productive scientific research centres has had a positive impact on the university at different levels. "The strictness and rigour with respect to the norms and products developed by CERN has brought us a series of benefits from the point of view of the experience and the links we have been able to establish with other centres associated with CERN". One of the main contacts developed by UTalca has been with GSI, a German company in the area of heavy ions and one of the first members of ALICE. In fact, the university and GSI are currently applying for an exchange project at CONICYT. "The benefit goes beyond simply participating in the project, which we take great pride in as a University - the relationship with other centres is also very important", says Guiñez.

All in all, the last five years have been an eventful period for Chilean collaboration with CERN. "Compared to the situation five years ago there has been an unmeasurable improvement because before the 2007 agreement, experimental particle physics simply did not exist in Chile. After the agreement it does exist", says Dr. Díaz. As for the ultimate goal of the work done at CERN, Dr. Díaz explains, "I have not enough imagination to think what the applications in the long term might be, but one can give some examples of similar situations in the past. Only a bit more than one hundred years ago the use of quantum mechanics was unknown, 50 years later the transistor was invented, and today, we cannot live without electronics, so I think that something similar is going to happen with the discoveries made at CERN".

## CASE STUDY



Workshop Panda Grid in November 2012 in Talca.



Dr. Sergey Kuleshov (left) and Dr. Will Brooks of Universidad Federico Santa María.

## VOICES

# How will ERANET-LAC support international STI cooperation?

*ERANet-LAC, a Network of the European Union (EU) and the Community of Latin American and Caribbean States (CELAC) on Joint Innovation and Research Activities started on the 1st of October, bringing together key stakeholders in research and innovation from both regions with a view to promoting and enhancing the opening of programmes and infrastructures and to fostering long-term partnerships. Stephanie Splett-Rudolph and Marianne Vaske, both from the German Federal Ministry of Education and Research (DLR), the institution that coordinates the consortium, explain how this bi-regional partnership will support international STI cooperation both within and beyond the project, including Chile's involvement, and how Chilean and international researchers can benefit from it.*

ERANet-LAC will strengthen bi-regional partnership in Science, Technology and Innovation (STI) by planning and implementing joint activities and creating a sustainable framework for future bi-regional joint activities. ERANet-LAC will implement two joint calls and organize joint activities to coordinate and cluster research programmes, establish research infrastructures and coordinate and open innovation programmes. The joint activities carried out will be evaluated and function as a basis for formulating a road map and establishing an EU-CELAC Platform for Funding Agencies. This funding platform will serve as an information and communication platform and offer substantial guidelines as well as online working spaces to facilitate and enhance the development of future joint initiatives.

## Chile's role in the project

Chile has two key roles in the project. First, Chile will be responsible for the promotion and coordination of existing EU-CELAC programmes. In particular, Chile will support the implementation of joint activities seeking to coordinate and cluster research programmes, open research infrastructures and coordinate innovation programmes.



EU-LAC Summit in Madrid in 2010. ERANet-LAC will support the political process of implementing the Joint Initiative for Research and Innovation (JIRI) endorsed by the summit action plan.

## VOICES

In addition, Chile will actively participate in the process of paving the way for innovative and sustainable bi-regional joint activities, which is one of the central objectives of ERANet-LAC. In this process, Chile will be responsible for the formulation of a road map for future joint activities.

**“THE SPECIFIC INITIATIVES WILL BE DEMAND-DRIVEN THROUGH A BOTTOM-UP APPROACH, GUARANTEEING A REAL INTEREST FROM BOTH SIDES. THIS MEANS THAT CHILEAN RESEARCHERS WILL HAVE THE OPPORTUNITY TO ACTIVELY PARTICIPATE IN BI-REGIONAL R&I PROJECTS INITIATED BY ERANET-LAC.”**

## What researchers can expect from the project

The project will foster the involvement of numerous national and international research and innovation (R&I) funding organizations from Latin America and Europe. The specific initiatives will be demand-driven through a bottom-up approach, guaranteeing a real interest

from both sides. This means that Chilean researchers will have the opportunity to actively participate in bi-regional R&I projects initiated by ERANet-LAC. ERANet-LAC will establish an EU-CELAC Platform for Funding Agencies which will serve as an information and communication pool and offer online working spaces to take up and develop future bi-regional joint activities.

## Germany's interest in supporting this initiative

The ERANet-LAC consortium consists of 17 international partners; eight of them belong to the CELAC region. The project will open and develop direct cooperation channels to relevant funding organizations and strategically important networks in STI all over the CELAC region which will enhance future cooperation with Germany considerably.

The ERANet-LAC partners will open the way to STI networks that are relevant for Germany. This is especially interesting as the project will focus particularly on the innovation aspect: since all over the CELAC region, applied research is presently being fostered, the project is expected to open new cooperation opportunities focusing on innovation.



Stephanie Splett-Rudolph



Marianne Vaske.



Dr. Sonia Montecinos at her office in the Centre for Advanced Studies in Arid Zones (CEAZA).

## Dr. Sonia Montecinos

An expert in non-conventional renewable energy (NCRE), Dr. Montecinos heads the research team from Universidad Arturo Prat participating in a wind and solar hybrid power system pilot project with the Chinese Academy of Agricultural Mechanization Sciences (CAAMS), of the Ministry of Science and Technology of the People's Republic of China (MOST). She explains how her research team intend to make the most of international collaboration.

### What has been the Chilean participation in this joint research project?

The project's objective was the installation in northern Chile of a hybrid (wind and solar) power system. Firstly, the Chilean team was responsible for finding a place, with certain sun and wind conditions, to install the system and where the generated energy could be used. In the end, a boarding technical school in Pozo Almonte, in the Atacama Region of Chile, was chosen. In addition, the team has found it worthwhile to carry out training and dissemination activities, which were not originally considered in the project, with the purpose of allowing students to learn about the installation and management of these systems. To

this end, Universidad Arturo Prat had already provided training to a group of school teachers on the use of photovoltaic panels.

### What stage is the project at?

The system is already operating and illuminates part of the aisle of the school. The system will illuminate other areas providing it is able to generate enough energy. For this reason, it is necessary to determine the performance of the photovoltaic panel and wind turbine under the sun and wind conditions on site. Now we need to install wind and solar radiation sensors, and to measure the energy generated by the photovoltaic panels and the wind turbine to obtain the data to allow us to determine the system's performance. Our Chinese

**"FINDING OUT HOW WIND TURBINES AND PHOTOVOLTAIC PANELS PERFORM UNDER THE METEOROLOGICAL CONDITIONS OF NORTHERN CHILE WILL ALLOW US TO DETERMINE THE FEASIBILITY OF USING THESE TECHNOLOGIES AS A SOURCE OF RENEWABLE ENERGY IN THE NORTH".**

counterpart is going to provide advice on the kind of equipment we could install, but other financial contributions will be needed to put the sensors in place and provide training to students, for these activities go beyond the scope of the collaborative project with CAAMS.

### What is the expected impact of this international collaboration project?

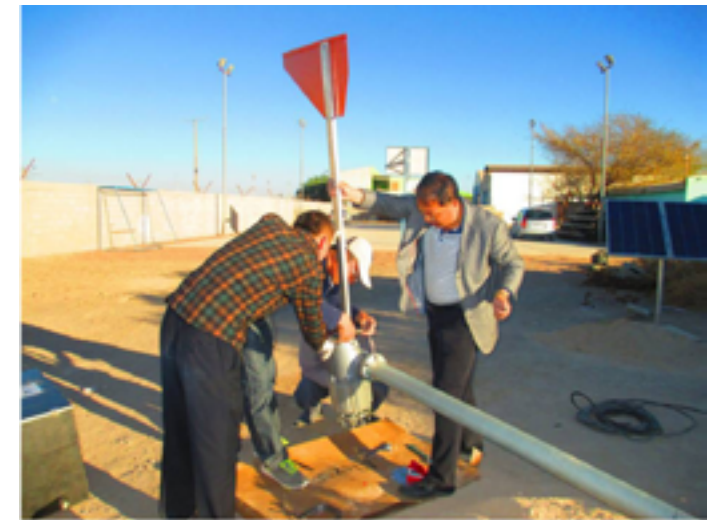
The performance of each technology varies in different parts of Chile or the world. In this sense, the interesting thing about this project is not the technology itself, but how it performs in the north of Chile. We have to monitor solar radiation and wind conditions on site to be able to determine the system's real-time performance. It is commonly accepted that to obtain high performance of wind turbines/photovoltaic panels, high wind/radiation conditions are needed. However, turbulences and high temperatures, which are common in the Atacama Desert, can decrease the performance of these technologies. This is precisely what we are to determine, and why the additional sensors are so important to really take advantage of the system installed in collaboration with our Chinese counterpart.

Finding out how wind turbines and photovoltaic panels perform under the meteorological conditions of northern Chile will allow us to determine the feasibility of using these technologies as a source of renewable energy in the north. Meteorological conditions in the north of Chile are quite unique and on that basis interesting knowledge could be generated.

The impact this project may have is mainly local, though the system could eventually be connected to the central interconnected system in the far north of Chile, which may be relevant given the Net Metering law, under consideration currently in Chile, which would allow individuals to have photovoltaic panels and wind turbines in our homes and inject the energy produce in excess into the distribution network.

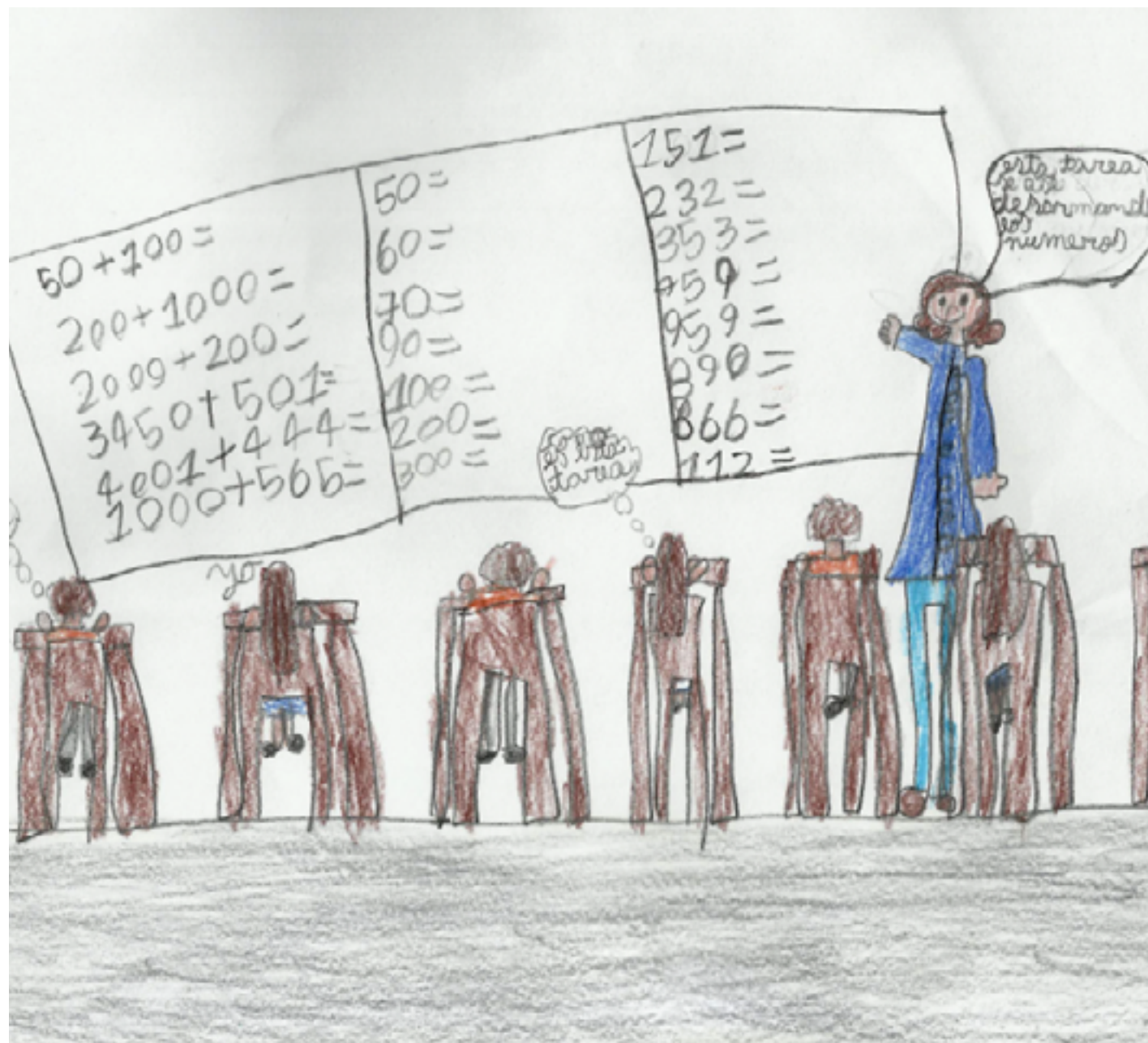
### What are the team's plans to take forward the collaboration with CAAMS?

We have identified some interesting projects. For instance, the use of solar and wind hybrid systems for irrigation. Last August we went to Huhhot, capital of Inner Mongolia in China, where the Huhhot Branch of the CAAMS (HBCAAMS) team showed us several systems that use photovoltaic panels and wind turbines very successfully to pump up underground



water for irrigation. In Chile, photovoltaic panels are used for irrigation – but not hybrid systems. Our Chinese counterpart also showed interest in establishing contact with electricity companies in order to install wind and photovoltaic parks, as well as for manufacturing wind turbines in Chile. It was interesting for us to learn that, unlike universities in Chile, CAAMS' mandate includes not only research, training and the development of technologies, but also commercialization activities.

International collaboration projects are useful to get to know partner institutions and identify common areas of interest. In particular, we could collaborate with China in the area of meteorology and wind energy forecast systems, which is very relevant given the difficulty of predicting how much energy can be produced. In sum, the idea is to learn about the respective capabilities we and our counterpart have and how we can take advantage of these.



## CONICYT-AKA research on education impacting Chile and beyond

**The development of the educational system has been identified as a priority area in both Chile and Finland. For this reason, in 2009 CONICYT, in partnership with the Academy of Finland (AKA), launched a call for joint research proposals in the field of education between team's of researchers in both countries. As a result of this call, four projects received funding for a total of three years. Here we take a brief look at the results achieved so far.**

### Learning to read with a child-friendly computer game

Graphogame is a computer game based on the training of core reading skills such as the correct correspondence between spoken and written language which lead to fluent and accurate reading of words and consequently to improved reading comprehension. It was developed by the Agora Human Technology Centre of the University of Jyväskylä in Finland and has been so far available on an internet based platform for free to more than 60,000 Finnish children. In Chile, the research team led by Dr. Ricardo Rosas from Pontificia Universidad Católica (PUC) adapted Graphogame to carry out a pilot and find out whether Graphogame works as expected in the Chilean context.

This Chilean and Finnish collaborative project developed from the fact that Finnish and Spanish are both so called "transparent" languages, with a close correspondence between spoken and written words. The project's objective is to evaluate to what extent it is possible to alleviate and prevent reading problems by playing child-friendly computer games, both individually and in group. According to Dr. Rosas this is a pioneering research project since up to now "most findings in reading acquisition, have been made in opaque languages (such as English), and the results are not always transferable to transparent languages".

### Making collaboration work

Research in Finland is focused on further developing the game, while in Chile the emphasis is on how to optimally implement the system and help disadvantaged children in the country. With this in mind, the research team at PUC adapted the evaluation instruments and Finnish software to Spanish. Over 100 children in Chile have been exposed to the phonological awareness training system Graphogame. Now the team is

October 2013



in the process of collecting the data obtained during those interventions.

According to Dr. Rosas, collaboration with the Finnish team has been key throughout the different stages of the project. In fact, the Chilean team has needed the Finnish team to make constant adjustments to the system. Furthermore, both teams have held theoretical and empirical discussions based on previous experiences. The experience of the Finnish counterpart, says Dr. Rosas "was vital for the development of the project since we basically replicated their experience in Chile. At the same time, the Finnish team used our feedback to further develop the game dynamics".

With the success of the Finnish experience, the research team in Chile is optimistic about the impact the project could have in the country. "We think that this project will have a great impact on education, since Graphogame has proved to be a very effective phonological training system, and Spanish speaking children will be able to access a fun and technically efficient system to improve their reading skills", says Dr. Rosas.

In Chile over 100 children have used Graphogame.

Photo page 18: drawing of a math class made by students participating in the project led by Dr. Varas.



### Building mathematical competencies using open-ended problem solving

Mathematical competencies are closely related to working mathematically. In fact, the international PISA assessment evaluates mathematical competencies to evaluate education systems worldwide. The relevance of mathematical competencies to mathematical learning however is often overlooked. Dr. Leonor Varas from Universidad de Chile, who is leading the Chilean team of the joint research project with the University of Helsinki, which looks to develop a model to improve mathematical comprehension, says little is known about how mathematical competencies are thought and learnt in the actual context of school classrooms. "The focus has always been on the content, not the competencies". Moreover, says Dr. Varas, mathematical competencies have been absent from the Chilean teacher training system.

This Chilean and Finnish collaborative project, explains Dr. Varas, "puts to the test a model by which primary school students through open ended problem solving develop a deep mathematical comprehension, as

well as mathematical abilities, increased mathematical confidence and the ability to solve new and challenging problems".

### Better classroom practices

The project uses a quasi-experimental design to monitor, over a three year period, primary school classes in Chile and Finland. During each school year, seven math classes are used to solve open ended problems. The classes are prepared jointly by the teachers participating in the project and the research team, taking care not to compromise teachers' plans or commitment to the national curriculum. Dr. Varas says "classes take place with at least a month difference in order to allow teachers time to reflect and make the class their own. The ultimate goal is to produce a "teacher change" in terms of beliefs, attitudes and practices in the teaching of maths".

Finland is one of the countries that does best at the PISA mathematics literacy test, in contrast to the modest results obtained by Chile. Although the reasons for the Finnish success are varied and complex, according to Dr. Varas, the Finnish educational system has undoubtedly proved to be able to develop the mathematical competencies that



Chilean and Finnish children participating in Dr. Varas's project.

are the focus of this research project. "Many of the concrete suggestions on how to implement the project in the classrooms come from their successful experience. The collaboration has been very important since they have a great team of researchers and numerous doctoral students who have done their theses within the framework of the project. This has been a truly joint research project, between colleagues who are able to contribute and influence each other".

The project's results will be presented on the 13th of December at an International Seminar about mathematical problem solving in Santiago. The event will include workshops where teachers who participated in the project will teach other teachers how to deliver classes with open-ended problems. The seminar will also serve as a platform to launch a book aimed at teachers that includes implemented problems, class plans and details about the teachers' experiences within the project. These research products, says Dr. Varas, "will definitely disseminate the results of the project enabling us to repeat, scale up and use this project to develop other similar models that incorporate declared competencies within the school

curriculum's educational objectives".

### Enhancing science teachers training

There is an ever increasing need for more effective strategies for teaching science. There is a particular need, to improve the understanding of how students learn specific scientific notions and how this knowledge can be used to make teaching more effective. Mario Quintanilla, Director of the Didactic Research in Sciences Lab (G.R.E.C.I.A) of the Pontificia Universidad Católica (PUC) is leading the Chilean team of a joint research project with the University of Helsinki, which compares how secondary school students in Chile and Finland learn specific scientific notions, in order to contribute to the improvement of classroom practices and the continuing education of teachers. According to Quintanilla, this study is unique in that it puts practising school science teachers at its core. In fact, over 600 school science teachers have taken part in different project activities. Another unique aspect of this study, says Quintanilla, is that "it seeks to analyze the process by which educational innovation experiences are conceptualized and designed for the teaching in

Finnish Public School participating in Mario Quintanilla's project.





Science teachers participating in the project led by Mario Quintanilla.

schools of different scientific notions in chemistry, biology and physics.”

The work developed in the last three years by this project revealed, according to Quintanilla, “the need for teachers to develop a more critical vision with a strong theoretical basis, for the identification, characterization and promotion of competencies scientific thinking among their students. We found neither totally dogmatic representations, nor conceptions totally focused on the proposal of a constructivist approach, nor new ideas about the teaching of science, citizenship and values, according to international trends”, says Quintanilla.

### New teaching culture

Within the framework of the project, says Quintanilla, “international collaboration represents on the one hand, a need to make visible groups of teacher-researchers who share certain theoretical frameworks and ideas for the improvement of scientific education. On the other hand, it represents an engine for strengthening meeting places that promote dialogues and exchanges between the academic sector and practicing and trainee science teachers; theoretical and methodological reflection on science didactic; production of scientific publications, among other things”.

In this sense the project has successfully developed an extended

network of contacts with universities both in Chile and abroad. Besides PUC, other institutions that are also taking part in this research project are: Universidad Católica de la Santísima Concepción, Universidad Central de Chile, Pontificia Universidad Católica de Valparaíso, Universidad Santo Tomás, Universidad de Santiago and Universidad Iberoamericana de Ciencias y Tecnología. Meanwhile, the international network has been extended to include members in Colombia, Mexico, Argentina, Brazil and Spain.

According to Quintanilla, the methodological and theoretical approach of this research supports the improvement of the initial and continuing education of science teachers at universities on the basis of the research findings, “in terms of the design and implementation of professional interventions that could be translated into the establishment of communities of empowered science teachers, reflective on and conscious of their educative practices, and convinced about the purpose of the teaching of science today and the need for a new teaching culture.”

### Understanding markets in education

The impact of the global trend towards the marketization of public schools that began in the 1980s requires alternative approaches in order to be fully understood. The PASC (Parents



“Key Aspects of the Finnish Educational Success Seminar” held in 2010 within the framework of the PASC project.

and School Choice: Family Strategies, Segregation and School Policies in Chilean and Finnish Basic Schooling) project adopts a sociologically-informed and mixed-methods approach to study the relationship between key issues in education, namely parental educational strategies, social segregation and local school-choice policies in two very different societies and cultures: Chile and Finland. Unlike most research in Chile, says Dr. Alejandro Carrasco, who is coordinating the Chilean research team of this joint research project, PASC “includes issues like broader state development, networks, urban segregation, beliefs and social values to make sense of how markets in education work.” Furthermore, Dr. Carrasco explains, “its mixed-method approach (surveys, ethnography, case studies) entails an epistemological stance where social actors are understood in terms of their local, historical, subjective configuration; not only in terms of cost-benefits rationality”.

### Informing the debate

The Chilean-Finnish comparative study is groundbreaking in the sense that it found that “there is not an abstract, theoretical way by which markets work everywhere. There are not, as hypothesized by economists, some general and universal rules by which it is possible to anticipate and assure the efficacy of markets in providing better equality

of opportunities. Markets in education are highly idiosyncratic depending on historical, societal, political, and each particular society’s cultural configurations. Markets are not a universal prescription to be recommended to solve broader educational problems”, explains Dr. Carrasco.

The findings of this research, according to Dr. Carrasco, contribute “to the understanding not only of markets themselves, but also of the limits they have, to support a broader agenda of school reform”, as well as to inform “the policy debate on how to strengthen the public educational system and provide fresh evidence to critically analyze other educational policies, on funding, admissions, and school autonomy, which are contributing to increased educational segregation”. During the development of this project, international collaboration has offered many benefits to the participants. “Working with colleagues from a strikingly different society has been key to understanding, from a neutral point of view, our own social arrangements. Without such a comparative view, our own biases would have affected data production, analysis and interpretation”, says Dr. Carrasco.

The results of this research will be published by Sense Publishers next year as a book entitled “Contrasting Dynamics in Education Politics of Extremes: school choice in Finland and Chile”.

## October



- 14 – 15 Chile: Opportunities for International Cooperation in STI Info Day (Brussels, Belgium)
- 16 – 17 Global Research Council Americas Regional Meeting (Ottawa, Canada)
- 23 – 24 ALCUENET-CYTED Thematic Meeting on Renewable Energies, Bioeconomy, ICT and Biodiversity & Climate Change (Mexico City, Mexico)
- 24 – 25 Pacific Alliance Scientific Meeting on Climate Change (Viña del Mar, Chile)
- TBC 2013 Abate Juan Ignacio Molina Prize for Excellence in Science Award Ceremony (Santiago, Chile)

## November



- 5 – 6 Stic-Amsud & Math-Amsud Programmes Multilateral Meeting (Santiago, Chile)
- 7 – 8 Math-Amsud Workshop (Santiago, Chile)
- 7 – 8 Chile-USA Collaboration in Cancer Conference and Workshop Research (Santiago, Chile)
- 11 – 13 ERANet-LAC Kick-off Meeting (Berlin, Germany)
- 19 – 20 ECOS Committee Meeting (Paris, France)
- 22 – 23 CYTED Steering Committee Meeting & General Assembly (Panama City, Panama)
- 25 – 26 Workshop on Patenting and Licensing (Santiago, Chile)
- 26 – 27 Chile-South Korea Workshop (Santiago, Chile)
- 28 – 29 Scientific Seminar and Workshop on Polar Science (Punta Arenas, Chile)

## December



- TBC Big Data Conference & Workshop (New Delhi, India)
- 2 – 4 AMERICAS Final Review Meeting/LEADERSHIP Kick-off Meeting (Madrid, Spain)

## the IR team

- Acting Director  
**Gonzalo Arenas**
- Director's Secretary  
**Ingrid Tapia**
- Acting Deputy Director  
**María Mesonero Kromand**
- International Cooperation Unit Coordinator  
**Rodrigo Monsalve**
- International Cooperation Programme Coordinator  
**Cecilia Velit**
- International Cooperation Programme Coordinator  
**Marlene Vargas Neira**
- International Cooperation Programme Coordinator  
**Catalina Palma**
- International Cooperation Programme Coordinator  
**Natalya Molina**
- ALMA – GEMINI – QUIMAL Funds Coordinator  
**Javier Martínez**
- Astronomy Budgeting and Management Officer  
**Andrea Zuñiga**
- Executive Secretary to the Astronomy Programme  
**Paola Jarpa**
- Head of Budgeting and Management for International Cooperation  
**Ricardo Contador**
- Projects Monitoring Coordinator  
**Adrien Quisefit**
- EU Projects Coordinator  
**Matthew Sheldon**
- Multilateral Projects Coordinator  
**Ivar Vargas Rivas**
- Projects Executive  
**Pedro Figueroa**
- Dissemination and Events Executive  
**Ana María Abraham**
- French Embassy Delegate  
**Héloïse Verweyen**
- Assistant  
**Marcos Arduengo Barrueto**

## visit

[www.conicyt.cl](http://www.conicyt.cl)

[www.sti-cooperation.cl](http://www.sti-cooperation.cl)

[issuu.com/dri-conicyt](http://issuu.com/dri-conicyt)

## contact us

[relacionesinternacionales@conicyt.cl](mailto:relacionesinternacionales@conicyt.cl)